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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,135	04/08/2004	David C. Collins	200400517-1	8954
22879 7590 08/21/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400				
EXAMINER				
SITTA, GRANT				
ART UNIT		PAPER NUMBER		
2629				
NOTIFICATION DATE		DELIVERY MODE		
08/21/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/821,135

**Applicant(s)**

COLLINS ET AL.

**Examiner**

GRANT D. SITTA

**Art Unit**

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 April 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 and 23-33 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☒ Claim(s) 26-33 is/are allowed.  
6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.  
7) ☒ Claim(s) 3-12, 15-19, 21 and 23-25 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 08 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. **7,109,981** (Damera-Venkata) in view of U.S. Pub. 2003/0020809 (Gibbon). Damera-Venkata teaches every limitation of claim one except "wherein each of the second set of pixels is centered relative to one of the first set of pixels." However, Gibbon teaches "the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions" ([0012]).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Damera-Venkata to include the use of a second set of pixels that

are centered relative to one of the first set of pixels as taught by Gibbon in order to allow “the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels” as stated in ([0012], of Gibbon).

2. Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. **7,301,549** (Damera-Venkata) in view of U.S. Pub. 2003/0020809 (Gibbon). Damera-Venkata teaches every limitation of claim one except “wherein each of the second set of pixels is centered relative to one of the first set of pixels.” However, Gibbon teaches “the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions” ([0012]).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Damera-Venkata to include the use of a second set of pixels that are centered relative to one of the first set of pixels as taught by Gibbon in order to allow “the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels” as stated in ([0012], of Gibbon).

***Claim Rejections - 35 USC § 103***

3. Claims 1, 2, 13, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al (6,384,816) hereinafter, Tabata.

4. In regards to claim 1, Tabata discloses the limitations of a method of displaying an image with a display device, the method comprising: receiving image data for the image, the image data comprising a first set of pixels; generating first and second sub-frames (abstract), wherein the first and the second sub-frames comprise a second set of pixels (col. 2, lines 14-61), alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position ("a first pixel position serving as standard; a second pixel position shifted with respect to the first, standard pixel position horizontally approximately by 1/2 of horizontal pixel pitch; a third pixel position shifted horizontally approximately by 3/4 or 1/4 of horizontal pixel pitch and vertically approximately by 1/2 of vertical pixel pitch; and a fourth pixel position shifted horizontally approximately by 1/4 or 3/4 of horizontal pixel pitch and vertically approximately by 1/2 of vertical pixel pitch" abstract and fig. 14 and fig. 15 (1,2,3,4)).

Tabata differs from the claimed invention in that Tabata does not expressly disclose wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by

Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

5. In regards to claim 13, Tabata discloses the limitations of a system for displaying an image, the system comprising:

a buffer adapted to receive image data for the image, the image data comprising a first set of pixels (fig. 12 (21) and (22));

an image processing unit configured to define first, second, third, and fourth sub-frames comprising a second set of pixels (fig. 8 (5)).

Tabata differs from the claimed invention in that Tabata does not expressly disclose wherein each of the second set of pixels is centered relative to a respective one of the first set of pixels.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

Therefore, Tabata as modified by Gibbon teaches a display device adapted to alternately display the first sub-frame in the first position, displaying the second sub-frame in the second position spatially offset from the first position ((col. 8, lines 1-12)

Tabata), displaying the third sub-frame in a third position spatially offset from the first position and the second position (fig. 5A (3) Tabata), and displaying the fourth sub-frame in a fourth position spatially offset from the first position (fig. 5B (4) Tabata), the second position, and the third position (fig. 5A and 5B (1,2,3,4) Tabata).

6. In regards to claim 20, Tabata discloses the limitations of a system for generating first, second, third, and fourth sub- frames (col. 2, lines 22-63) for display at spatially offset positions to generate the appearance of an image (col. 2, lines 22-63), the system comprising:

means for receiving image data corresponding to the image (fig. 8 video signal);  
means for generating the first, the second, the third, and the fourth sub-frames using the image data (col. 2, lines 22-63), each of the first, second, third, and fourth sub-frames comprising a plurality of sub-frame pixel values that correspond to a plurality of sub-frame pixels(col. 2, lines 22-63), and

means for calculating a plurality of simulated image pixel (col. 2, lines 22-63) values for a simulated image by convolving each of the sub-frame pixel values with at least four other sub-frame pixel values (fig. 9 3-1,3-2,3-3,3-4 and 3-5); Examiner notes that the sub-frames are convolved by viewing over a period of time and

means for updating the first, the second, the second, the third, and the fourth sub- frames in accordance with a difference between the simulated image and the image data (col. 5, lines 59-67 turning off and on an applied voltage).

Tabata differs from the claimed invention in that Tabata does not disclose wherein each of the plurality of sub-frame pixels are centered with respect to a respective one of a plurality of pixels of the image data.

However, Gibbon teaches a system and method for a set of pixels centered relative to a respective one of another set of pixels (fig. 6, and fig. 10 [0012]). Examiner notes that Gibbons teaches the centered special relationship between two sub-images.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata to include the use of a set of centered pixels as taught by Gibbon in order to provide a means to superimpose an image in order to produce a high resolution image as stated in ([0010-0012] of Gibbon).

7. In regards to claim 2, Tabata as modified by Gibbon teaches generating third and fourth sub-frames, wherein the third and the fourth sub-frames comprise the second set of pixels (fig. 14 and 15 (1,2,3 and 4) and (3-1,3-2,3-4,3-6,3-6) Tabata), wherein each of the second set of pixels is centered relative to one of the first set of pixels (fig. 6, and fig. 10 [0012] Gibbon); and alternating between displaying the first sub-frame in the first position, displaying the second sub-frame in the second position spatially offset from the first position ((col. 8, lines 1-12) Tabata), displaying the third sub-frame in a third position spatially offset from the first position and the second position (fig. 5A (3) Tabata), and displaying the fourth sub-frame in a fourth position spatially offset from the first position (fig. 5B (4) Tabata), the second position, and the third position (fig. 5A and



5B (1,2,3,4) Tabata).

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata in view of Gibbon, further in view of Groenenboom et. al (US PUB 6,304,245) hereinafter, Groenenboom.

9. In regards to claim 14, Gibbon discloses the limitations of claim 13 Tabata and Gibbon differs from the claimed invention in that Tabata and Gibbon do not disclose wherein the first set of pixels comprises a plurality of pixels at a first resolution, and wherein the second set of pixels comprises a plurality of pixels at a second resolution less than the first resolution.

However, Groenenboom teaches a system and method for "wherein the first set of pixels (foreground) comprises a plurality of pixels at a first resolution ("having different resolution"), and wherein the second set of pixels comprises a plurality of pixels (background) at a second resolution less than the first resolution "(abstract, fig. 5 col. 3-4, lines 6-25 of Groenenboom).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Tabata and Gibbon to include the use of mixing a foreground picture and a background picture as taught by Groenenboom in order to mix differing resolutions with out yielding visible artifacts as stated in (col. 1, lines 5-15 of Groenenboom).

***Allowable Subject Matter***

10. Claims 26-33 allowed.

11. Claim 3-12, 15-19, 21, 23-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 26-33, the major difference between the teaching of the said prior art of record and that of the instant invention is that said prior art **does not teach** generating a simulated image by convolving the first, the second, the third, and the fourth sub-frames with an interpolating filter that comprises a first set of filter coefficients; and updating the first, the second, the third, and the fourth sub-frames in accordance with a difference between the simulated image and the first image, in regards to the centered pixels of the sub frames and the first image.

***Response to Arguments***

12. Applicant's arguments with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection.

13. In response to Applicant's remarks regarding Double Patenting, Examiner respectfully disagrees. Damera-Venkata teaches "receiving image data for the image on a high resolution grid; generating a first sub-frame and a second sub-frame corresponding to the image data..." and "...alternating between displaying the first sub-frame in a first position and displaying the second sub-frame in a second position spatially offset from the first position." (claim 1). Gibbon teaches "that the two resulting sub-images are offset by one half of a pixel in both horizontal and vertical directions, allowing the two sub-images to combine to produce a final image having a greater resolution than that provided by the actual pixels" [0012].

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify Damera-Venkata to include the use of a second set of pixels that are centered relative to one of the first set of pixels as taught by Gibbon in order to allow "the two sub-images" to combine to produce a final image having a greater resolution than that provided by the actual pixels" as stated in ([0012], of Gibbon).

Applicant contends that "[t]his teaching describes a relationship between "the two resulting sub-images" of Gibbon. The teaching does not, however, describe the spatial relationship between "the two resulting sub-images" and the image data from which "the two resulting sub-images" were created." (Remarks page 9). However, Examiner is merely relying on the centered resulting sub-images of Gibbon and for Damera-Venkata to teach the relationship between sub-frames and the image data.

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

**Venkateswar** (5,490,009) Enhanced resolution for digital micro-mirror.

**Cooper** (5,424,780) Apparatus and method for a special scan modulation of a video display.

**Shirochi** (5,689,283) Display for mosaic pattern of pixel information with optical pixel shift for high resolution.

**Potu** (5,719,594) Method and system in a data processing system for improved video image resolution when enlarging a video sequence.

**Oliyide** (5,978,518) Image enhancement in digital image processing.

**Hill** (6,239, 783) Weighted mapping of image data samples to pixel sub-components on a display device.

**Fergason** (6,243,055) Optical display system.

**Itoh** (2003/0011614) Image display method.

**Demetrescu** (6,657,603) Projector with circulating pixels.

**Shimada** (6,791,512) Image display device.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GRANT D. SITTA whose telephone number is (571)270-1542. The examiner can normally be reached on M-F 9-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on 571-272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2629

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sumati Lefkowitz/  
Supervisory Patent Examiner, Art Unit 2629

/GDS/  
August 15, 2008